IN THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims

1. (Currently Amended) A method for detecting one or more analytes in a fluid, comprising:

providing a sensor including a polymer capable of undergoing a proton-coupled redox reaction, the polymer ~~including a plurality of~~ comprising two or more chemically different reactive substituents capable of undergoing a reaction with an analyte;

exposing the sensor to a fluid containing the analyte; and

detecting a response to the exposure of the sensor to the analyte based on a change in the pK_a of the polymer.

2. (Canceled)

3. (Currently Amended) The method of ~~claim 2~~ claim 1, wherein:

the two or more chemically different reactive substituents have selectivity for different analytes.

4. (Currently Amended) The method of ~~claim 2~~ claim 1, wherein:

the two or more chemically different reactive substituents have different effects on the pK_a of the polymer.

5. (Currently Amended) The method of claim 1, wherein:

~~one or more of~~ the reactive substituents have an inductive effect on the pK_a of the polymer.

6. (Currently Amended) The method of claim 1, wherein:

~~one or more of~~ the reactive substituents have a resonance effect on the pK_a of the polymer.

7. (Currently Amended) The method of claim 1, wherein:

the analyte reacts with ~~one or more of~~ the reactive substituents upon exposure of the sensor film to the fluid to cause a change in the pK_a of the polymer.

8. (Original) The method of claim 1, wherein:

the sensor includes one or more conjugated polymers.

9. (Original) The method of claim 8, wherein:

at least one of the conjugated polymers is selected from the group consisting of polyaniline, poly(o-phenylenediamine), poly(o-aminophenol), polyphenoxazine, polyphenothiazine, and poly(aminonaphtalene).

10. (Original) The method of claim 1, wherein:

the polymer is a functionalized polyaniline.

11. (Original) The method of claim 1, wherein:

the polymer is a poly(aniline boronic acid).

12. (Original) The method of claim 11, wherein:
the poly(aniline boronic acid) is substantially a homopolymer of 3-aminophenylboronic acid.

13. (Original) The method of claim 1, wherein:
at least a plurality of the reactive substituents are selected from the group consisting of boronic acids, pyridines, bipyridines and thiols.

14. (Original) The method of claim 1, wherein:
the analyte is selected from the group consisting of polyols, fluorides, and amines.

15. (Original) The method of claim 1, wherein:
the analyte is a metal selected from the group of metals capable of forming a complex with a ligand selected from the group consisting of pyridines, bipyridines and thiols.

16. (Currently Amended) The method of claim 1, wherein:
~~one or more of~~ the reactive substituents are capable of undergoing a reversible reaction with the analyte.

17. (Currently Amended) The method of claim 1, wherein:
~~one or more of~~ the reactive substituents are capable of undergoing an irreversible reaction with the analyte.

18. (Original) The method of claim 1, wherein:
the polymer is a poly(aniline boronic acid); and
the analyte is a polyol.

19. (Original) The method of claim 1, wherein:

the response is a change in the electrochemical potential of the sensor relative to a reference electrode.

20. (Original) The method of claim 1, wherein:

the response is a change in pH.

21. (Original) The method of claim 1, wherein:

the response is a change in the conductivity of the sensor.

22. (Original) The method of claim 1, wherein:

the response is a change in the impedance of the sensor.

23. (Original) The method of claim 1, wherein:

the sensor has a color; and

the response is a change in the color of the sensor.

24. (Original) The method of claim 1, wherein:

the sensor has a mass; and

the response is a change in the mass of the sensor.

25. (Original) The method of claim 1, further comprising:

identifying the analyte based on the detected response.

26. (Currently Amended) The method of claim 25, wherein:

~~one or more of~~ the reactive substituents are capable of reacting with a plurality of different analytes; and

identifying the analyte includes distinguishing between at least one analyte in the fluid and at least one of the plurality

of different analytes capable of reacting with the reactive substituents based on the detected response.

27. (Currently Amended) The method of claim 25, wherein:

~~one or more of~~ the reactive substituents are capable of reacting with a plurality of different analytes; and

identifying the analyte includes distinguishing between a plurality of different analytes in the fluid based on the detected response.

28. (Original) The method of claim 25, further comprising:

identifying a concentration of the analyte in the fluid based on the detected response.

29. (Original) The method of claim 28, further comprising:

exposing the sensor to a second fluid;

detecting a second response; and

identifying a change in the concentration of the analyte based on the response and the second response.

30. (Currently Amended) The method of claim 16, wherein:

the sensor is exposed to the fluid for a time sufficient to allow the reaction between ~~at least one of~~ the reactive substituents and the analyte to reach an equilibrium; and

detecting the response includes measuring the response at the equilibrium.

31. (Currently Amended) A sensor system for detecting an analyte in a fluid, comprising:

a fluid volume;

a sensor located in operable contact with the fluid volume, the sensor including a substrate having a surface, and a sensor film deposited on the substrate surface, the sensor film including a polymer capable of undergoing a proton-coupled redox reaction, the polymer ~~including a plurality of~~ comprising two or more chemically different reactive substituents capable of undergoing a reaction with an analyte; and

a detector configured to detect a response based on a change in the pK_a of the polymer when the sensor is exposed to a fluid in the fluid volume.

32. (Canceled)

33. (Currently Amended) The sensor system of ~~claim 32~~ claim 31, wherein:

the two or more chemically different reactive substituents have selectivity for different analytes.

34. (Currently Amended) The sensor system of ~~claim 32~~ claim 31, wherein:

the two or more chemically different reactive substituents have different effects on the pK_a of the polymer.

35. (Currently Amended) The sensor system of claim 31, wherein:

~~one or more of~~ the reactive substituents have an inductive effect on the pK_a of the polymer.

36. (Currently Amended) The sensor system of claim 31, wherein: ~~one or more of~~ the reactive substituents have a resonance effect on the pK_a of the polymer.

37. (Currently Amended) The sensor system of claim 31, wherein: the analyte reacts with ~~one or more of~~ the reactive substituents upon exposure of the sensor film to the fluid to cause a change in the pK_a of the polymer.

38. (Original) The sensor system of claim 31, wherein: the sensor film includes one or more conjugated polymers.

39. (Original) The sensor system of claim 38, wherein: at least one of the conjugated polymers is selected from the group consisting of polyaniline, poly(o-phenylenediamine), poly(o-aminophenol), polyphenoxazine, polyphenothiazine, and poly(aminonaphtalene).

40. (Original) The sensor system of claim 31, wherein: the polymer is a functionalized polyaniline.

41. (Original) The sensor system of claim 31, wherein: the polymer is a poly(aniline boronic acid).

42. (Original) The sensor system of claim 41, wherein: the poly(aniline boronic acid) is substantially a homopolymer of 3-aminophenylboronic acid.

43. (Original) The sensor system of claim 31, wherein:

one or more of the polymers are prepared by a process including the electrochemical polymerization of 3-aminophenylboronic acid.

44. (Currently Amended) The sensor system of claim 31, wherein:

~~at least a plurality of~~ the reactive substituents are selected from the group consisting of boronic acids, pyridines, bipyridines and thiols.

45. (Original) The sensor system of claim 31, wherein:

the analyte is selected from the group consisting of hydroxides, fluorides, and amines.

46. (Original) The sensor system of claim 31, wherein:

the analyte is a metal selected from the group of metals capable of forming a complex with a ligand selected from the group consisting of pyridines, bipyridines and thiols.

47. (Currently Amended) The sensor system of claim 31, wherein:

~~one or more of~~ the reactive substituents are capable of undergoing a reversible reaction with the analyte.

48. (Currently Amended) The sensor system of claim 31, wherein:

~~one or more of~~ the reactive substituents are capable of undergoing an irreversible reaction with the analyte.

49. (Original) The sensor system of claim 31, wherein:
the polymer is a poly(aniline boronic acid); and
the analyte is a polyol.

50. (Original) The sensor system of claim 31, wherein:
the response is a change in the electrochemical potential of the sensor film relative to a reference electrode.

51. (Original) The sensor system of claim 31, wherein:
the response is a change in pH.

52. (Original) The sensor system of claim 31, wherein:
the response is a change in the conductivity of the sensor film.

53. (Original) The sensor system of claim 31, wherein:
the response is a change in the impedance of the sensor film.

54. (Original) The sensor system of claim 31, wherein:
the sensor film has a color; and
the response is a change in the color of the sensor film.

55. (Original) The sensor system of claim 31, wherein:
the sensor film has a mass; and
the response is a change in the mass of the sensor film.

56. (Original) The sensor system of claim 31, further comprising:

a programmable processor coupled to the detector, the processor being configured to identify the analyte based on the detected response.

57. (Currently Amended) The sensor system of claim 56, wherein:

~~one or more of~~ the reactive substituents are capable of reacting with a plurality of different analytes; and

the programmable processor is operable to distinguish between at least one analyte in the fluid and at least one of the plurality of different analytes capable of reacting with the reactive substituents based on the detected response.

58. (Currently Amended) The sensor system of claim 56, wherein:

~~one or more of~~ the reactive substituents are capable of reacting with a plurality of different analytes; and

the programmable process is operable to distinguish between a plurality of different analytes in the fluid based on the detected response.

59. (Original) The sensor system of claim 56, wherein:

the programmable processor is operable to identify a concentration of the analyte in the fluid based on the detected response.

60. (Original) The sensor system of claim 59, wherein:

the detector is configured to detect a second response when the sensor film is exposed to a second fluid; and

the programmable processor is operable to identify a change in the concentration of the analyte based on the response and the second response.

61. (Original) The sensor system of claim 31, wherein:

the detector is configured to measure the response at an equilibrium of the reaction between the reactive substituents and the analyte.

62. (Currently Amended) A sensor system for detecting an analyte in a fluid, comprising:

means providing a sensor film including a polymer capable of undergoing a proton-coupled redox reaction, the polymer ~~including a plurality of~~ comprising two or more chemically different reactive substituents capable of undergoing a reaction with an analyte;

means for exposing the sensor film to a fluid containing the analyte; and

means for detecting a response to the exposure of the sensor film to the analyte based on a change in the pK_a of the polymer.

63. (New) A method for detecting one or more analytes in a fluid, comprising:

providing a sensor comprising a poly(aniline boronic acid) polymer capable of undergoing a proton-coupled redox reaction, the polymer including a plurality of reactive substituents capable of undergoing a reaction with an analyte;

exposing the sensor to a fluid containing the analyte;

and

detecting a response to the exposure of the sensor to the analyte based on a change in the pKa of the polymer.

64. (New) A sensor system for detecting an analyte in a fluid, comprising:

a fluid volume;

a sensor located in operable contact with the fluid volume, the sensor including a substrate having a surface, and a sensor film deposited on the substrate surface, the sensor film comprising a poly(aniline boronic acid) polymer capable of undergoing a proton-coupled redox reaction, the polymer including a plurality of reactive substituents capable of undergoing a reaction with an analyte; and

a detector configured to detect a response based on a change in the pKa of the polymer when the sensor is exposed to a fluid in the fluid volume.

65. (New) A method for detecting one or more analytes in a fluid, comprising:

providing a sensor comprising a polymer capable of undergoing a proton-coupled redox reaction, the polymer including a plurality of reactive substituents capable of undergoing a reaction with an analyte;

exposing the sensor to a fluid containing the analyte;

and

detecting a response to the exposure of the sensor to the analyte based on a change in the pKa of the polymer, wherein the response is selected from the group consisting of a change in

electrochemical potential, a change in conductivity, a change in impedance, a change in mass, and any combination of the foregoing.

66. (New) A sensor system for detecting an analyte in a fluid, comprising:

a fluid volume;

a sensor located in operable contact with the fluid volume, the sensor including a substrate having a surface, and a sensor film deposited on the substrate surface, the sensor film comprising a polymer capable of undergoing a proton-coupled redox reaction, the polymer including a plurality of reactive substituents capable of undergoing a reaction with an analyte; and

a detector configured to detect a response based on a change in the pKa of the polymer when the sensor is exposed to a fluid in the fluid volume, wherein the response is selected from the group consisting of a change in electrochemical potential, a change in conductivity, a change in impedance, a change in mass, and any combination of the foregoing.